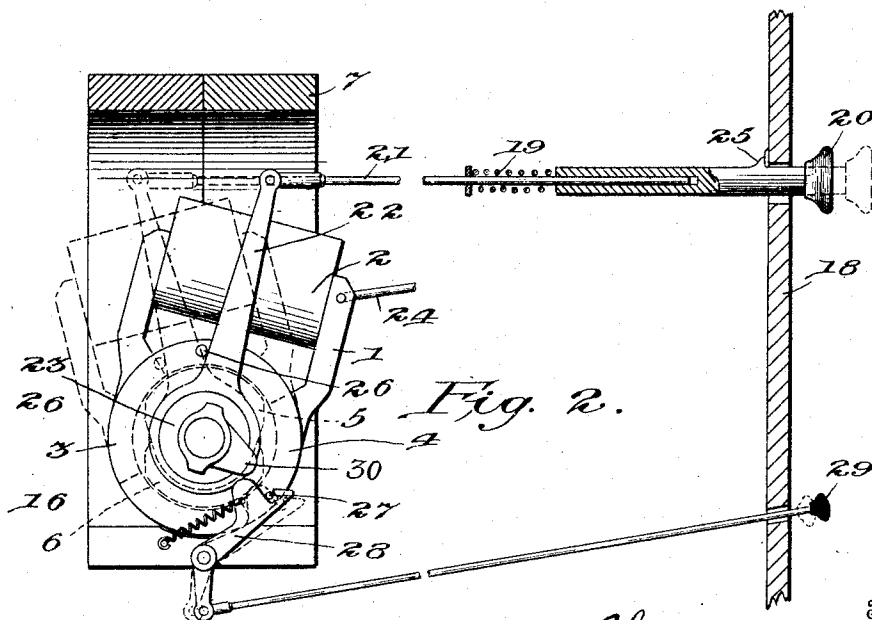
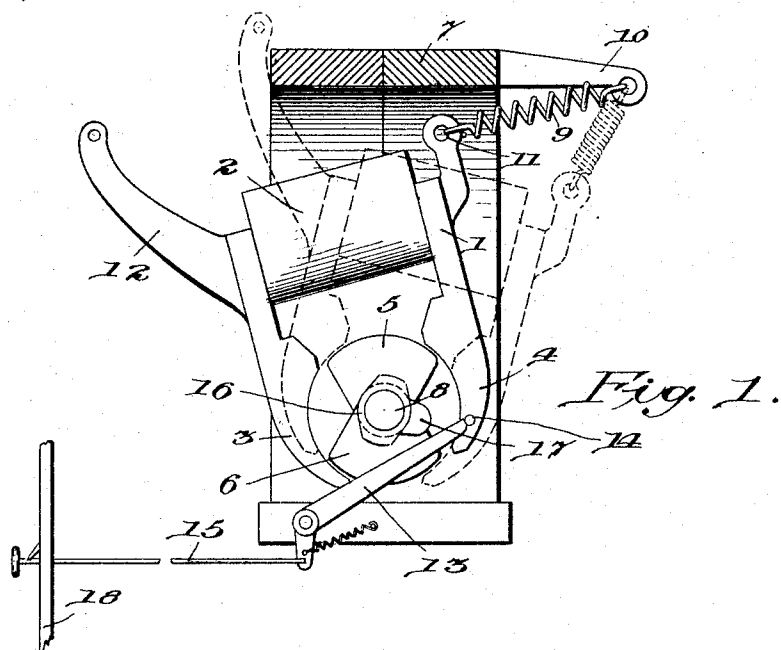


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IGNITION DYNAMO.
APPLICATION FILED JULY 28, 1913.

1,178,089.

Patented Apr. 4, 1916.



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IGNITION-DYNAMO.

1,178,089.

Specification of Letters Patent.

Patented Apr. 4, 1916.

Application filed July 28, 1913. Serial No. 781,696.

To all whom it may concern:

Be it known that I, CHARLES THOMAS MASON, a citizen of the United States, residing at Sumter, in the county of Sumter and State of South Carolina, have invented certain new and useful Improvements in Ignition-Dynamos, of which the following is a specification, reference being had to the accompanying drawing.

My invention relates to ignition dynamos, and particularly to those of the magneto type, and has for its object to provide means whereby the magneto may be caused to produce a spark for ignition when the engine to which it is connected is at rest.

Another object of the invention is to provide a machine that combines the advantages of the rotary and the oscillating type in one structure without complication, and without the necessity of disconnecting the rotating parts from the driving shaft when the oscillating feature is in use.

A further object is to provide a machine that can be actuated in two different ways to produce a spark.

My invention is particularly adapted for motor vehicles, and embraces improved means whereby the driver of the vehicle may actuate the machine from his seat.

The above objects are obtained by certain novel features of construction and arrangement of parts which will be readily understood by reference to the description of the drawings, and the claims to be hereinafter given.

It is well known to those skilled in the art, that a battery must be used to start from a standstill an engine equipped with a gear driven magneto of the usual type, having a rotary armature, as it is obviously impossible for the magneto to generate any current unless the armature or its equivalent is in motion. Any device, therefore, that will enable the magneto to be operated to produce an igniting spark without the necessity of moving the engine to which it is connected, will enable the engine to be started on the magneto so far as concerns ignition, but it is obvious that for this to be practical, the arrangement must be such that a number of sparks can be produced in

case the first one fails to ignite the charge, and furthermore, the device must be free from complication, and so arranged that after the engine starts there will be no danger of wrecking the starting mechanism on the magneto.

In the accompanying drawings, Figure 1 is a side view of a magneto embodying my invention, and Fig. 2 a modification showing a magneto having means for advancing and retarding the spark.

The same figures of reference denote the same parts wherever they are shown.

To carry out my invention, it is necessary to employ a magneto having a core or armature structure carrying the generating windings. Such a machine is disclosed in my application, Serial No. 696487 of May 10th, 1912, but any other machine having the windings carried on a movable armature structure so that the flux through same can be varied as hereinafter described, may be employed. Upon an understanding of my invention it will be apprehended also that still other means may be used. The generating winding may or may not be supported from such means.

1 denotes the movable armature structure carrying the windings indicated at 2. The lower extremities of this armature structure form armature pole shoes 3 and 4, adjacent which are rotary inductor elements 5 and 6 which conduct the flux from the permanent magnet 7, to the armature structure. This structure is movably positioned in the magneto in any suitable manner so that it can be moved with the shaft 8 as a center, thereby advancing and retarding the spark. This method of construction is fully described in my application S. N. 696,487 hereinbefore mentioned.

It is obvious that by rotating shaft 8 carrying rotors 5 and 6, the magnetic flux will be carried to the armature structure, and a current generated in the windings, this operation being what ordinarily takes place in any magneto equipped with a rotor structure. Now if the shaft 8 carrying the rotor, is stationary and the armature structure 1 is moved about the rotor, current will be generated the same as if the rotor were

moved. This fact I take advantage of, and to insure quick action provide the armature structure with a spring 9 which is attached at one end to a suitable support 10, and at its other end to the armature structure at 11. I also provide means such as the lever 12, by which the armature structure may be drawn to one side against the tension of spring 9.

10 The magneto is mounted on the engine and the rotor geared thereto in the usual manner. When it is desired to start the engine, the armature structure being in normal position shown by the dotted lines Fig. 1, it is drawn to one side by the handle 12, against the tension of spring 9, thereby causing dog 13 to engage pin 14 which holds it to one side, as shown in solid lines Fig. 1. Any suitable means may be provided in connection with rod 15 or dog 13 for preventing extreme upward movement of the dog, such for instance as the stop shown on the left of the dash 18, or the end of knob on the end of rod 15 may itself abut against the face of the dash and prevent too great movement. The dog 13 is now released by any suitable means such as the rod 15, thereby releasing the armature structure. It is suddenly jerked into normal position by spring 9. The movement of the pole shoes 3 and 4 of the armature past the rotor, has exactly the same effect as a movement of the rotor past them would have, and a current is generated which produces an igniting spark in the cylinder of the engine, thereby putting same in motion. The rotor now revolves, and current is generated in the usual manner, the armature remaining in the normal position shown by dotted lines.

40 It is obvious that a spark may always be produced by the arrangement just described, regardless of the position of the rotor, since the throw of the armature structure may be made sufficiently great and the rotor lobes so proportioned that current will always be produced when the armature structure is oscillated. The pole shoes 3 and 4 sweep around a sufficient portion of the path of travel of the rotor to cause a reversal of flux and open the usual interrupter contacts (not shown) which are movable with the armature structure but operated by cam 16 on the rotor shaft.

At times the rotor may not stop with the piston or pistons in the proper position for starting as just described, and it is necessary to crank the engine. To obviate the necessity of operating rod 15 to release the magneto and produce the initial spark, I provide a cam 17, which, when the armature structure is in the starting position and the rotor is revolved as is the case when the motor is turned, will engage 13 and release the armature structure. This produces a good spark regardless of how slowly the motor is

turned as the movement of the armature structure is independent thereof and by means of spring 9. As soon as the armature structure assumes its normal position, 13 is held down by pin 14 out of the way of cam 17.

The spark produced by the spring actuated armature structure is of proper intensity to ignite the mixture, because of the rapid relative movement of the parts. This feature constitutes the apparatus a "self starter" in the event that a suitable mixture is in the motor when the spark is produced. All complicated driving devices to obtain a quick partial revolution of the rotor are avoided. In the case of automobile motors suitable levers for operating the device can be led to a convenient point near the driver, as on the dash board 18.

Fig. 2 shows a modification necessary when my invention is used with a magneto adapted for variable ignition. In such a magneto, of the preferred type having a movable armature structure carrying the generating coil, it is necessary to move the coil structure to advance and retard the spark. The spring 19 is, normally, not compressed, the actuating rod 20 being in the position shown in dotted lines. The rod 21 and arm 22 are supported on a shoulder 23 of the armature structure, but are not rigidly connected thereto. Rod 24, the usual advance and retard lever rod, will move the armature structure from the retard position to advance, thereby permitting the timing to be accomplished in the usual manner. The starting mechanism operates as follows: Rod 20 is pushed in, until shoulder 25 engages a suitable stop or is engaged by a suitable latch. This holds the spring 19 under compression, since arm 22 cannot move to the left because of pin 26 of the armature structure which in turn is held by pin 27 engaging a notch in pawl 28. To fire, rod 29 is pushed in thereby depressing 28, releasing 27 and permitting spring 19 to throw the armature structure 1 to the left. If the spring 19 is set to operate, and the motor turned over, cam 30 will depress pawl 28, thereby operating the magneto as just described without the necessity of operating rod 29. Igniting sparks may be repeatedly produced by operating the rods 20 and 29, in case the first spark does not fire the charge. As soon as the engine starts, the rotor shaft turns. This will not affect the starting mechanism, and there is no danger of wrecking the magneto if both means of generating the current are in use simultaneously, or if any of the rods are manipulated while the rotor is in motion. After the starting operation, the armature structure 1 may be moved to any desired position to suitably time the ignition, by simply returning the plunger 20 to normal position (rotat-

ing it to free latch 25) and thereafter manipulating link 24 which is suitably connected to the spark lever.

While I have shown but one form of operating mechanism for the armature structure, it is obvious that any suitable mechanical means may be employed whereby the armature structure may be moved without having to disconnect or disassociate the rotor structure from the engine. In devices of this kind, attempts have been heretofore made to free the rotor shaft from its connection with the engine or driving means, so that the rotor could be moved to generate a spark with the engine stopped. These methods require the uncoupling of the driving gears, or the interposition of some clutch mechanism, or the use of sliding sleeves or other devices on the armature shaft, all of which are complicated, liable to wear, and uncertain in operation. This is unnecessary with my invention. While I show a spring for actuating the armature structure, it will be understood that this spring or its equivalent is not strictly necessary, as a spark can be produced by simply oscillating the armature structure by hand, although such a method would not be practical, the magneto usually being out of reach of the person starting the engine and it being impracticable to oscillate the armature structure by hand at the high rate of speed possible with the sparking.

Having thus described my invention what I claim and desire to secure by Letters Patent is:

1. A dynamo for ignition comprising a stationary magnet, a normally fixed armature structure carrying windings, a rotor adapted to conduct the flux reversibly from the poles of the stationary magnet to the poles of the armature structure, and motor means connected to said armature structure whereby it may be oscillated.

2. In a dynamo for ignition, a rotor, an armature structure for receiving the flux carried by said rotor, and motor means connected to said armature structure for manually oscillating the same to produce a spark independently of the movement of the said rotor, substantially as described.

3. In a dynamo for ignition, a normally fixed armature structure carrying windings, tension means connected to said armature structure, and means for pulling said armature structure against said tension means and

for suddenly releasing the same, together with an exciting field for said windings, and driven means for reversibly transferring the flux from said exciting field to said armature structure.

4. In an ignition dynamo, two elements, one a fixed non-rotatable armature element carrying a generating winding, and the other a field element adapted to produce a magnetic flux in said armature element, means associated with the field element normally driven to produce variations of the flux through the armature element, and independent means associated with the armature element, adapted by its own operation to produce flux variations in the armature element accompanied by variable magnetomotive forces, whereby corresponding variable electromotive forces may be generated in the windings.

5. In an ignition dynamo, two elements, one a fixed non-rotatable armature element carrying a generating winding, and the other a field element adapted to produce a magnetic flux in said armature element, means associated with the field element normally power driven to produce variations of the flux through the armature element, and independent manually operated means associated with the armature element, adapted by its own operation to produce flux variations in the armature element accompanied by variable magnetomotive forces, whereby corresponding variable electromotive forces may be generated in the windings.

6. In an ignition dynamo, an exciting field structure and a generating winding, means for shifting the flux of the field structure with respect to the winding, and independent means for shifting the winding with respect to the flux shifting means.

7. In a magneto electric machine, non-rotatable armature and field members, means to shift the flux from said field member with respect to the armature member, and means to shift said armature member with respect to said field member, one of said shifting means being of a rotary character and the other of a self-acting instantaneously operating oscillatory character.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

CHARLES THOMAS MASON.

Witnesses:

F. C. MANNING,
H. R. VAN DEVENTER.